



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/752,610	12/27/2000	Michael S. Lacy	LAM2P221	1307
25920	7590	10/15/2003	EXAMINER	
MARTINE & PENILLA, LLP 710 LAKEWAY DRIVE SUITE 170 SUNNYVALE, CA 94085			TRAN, BINH X	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 10/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/752,610

Applicant(s)

LACY, MICHAEL S.

Examiner

Binh X Tran

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5,6,10,11,15,20,22 and 23 is/are rejected.
- 7) ☒ Claim(s) 2-4,7-9,12-14,16-19 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 22 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In claim 22, the examiner does not understand the limitation "copper dielectric". It is well known in the art, that copper is conductor material, wherein the dielectric is a nonconductor material. It is impossible for copper to act as a dielectric material. It is also impossible for dielectric material to have a property of copper.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 5-6, 10, 15, 20, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence (US 3,923,567) in view of Li (US 6,276,997).

Respect to claim 1, Lawrence discloses a method comprising the step of:

Art Unit: 1765

providing a silicon substrate;

depositing a sacrificial oxide layer (i.e. SiO₂) over a first surface of the silicon substrate (Fig 2);

defining a test pattern over the surface of the oxide layer (Fig 2);

fabricating the test structure over the oxide layer;

removing the test pattern structure and the oxide layer from the silicon substrate (Fig 3).

Lawrence fails to disclose the step of characterizing a CMP process using a test pattern. In a semiconductor method, Li teaches characterizing a CMP process using a test pattern (i.e. layer formed over the substrate). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Lawrence in view of Li by characterize CMP process using the test pattern because it will smooth the wafer surface so it can be recycled.

Respect to claims 5-6, Lawrence teaches the removing/stripping of the test pattern and the oxide layer allow the wafer to be reclaimed and reused. Respect to claim 10, Lawrence discloses the transistor structure formed over the substrate (Fig 2). Li discloses a CMP process will provide data such as polishing rate of the test structure.

Respect to claim 15, Li teaches the reclaiming process is performed so that the semiconductor wafer can be re-stored and re-used (col. 7 lines 38-60). Since the semiconductor wafer can be re-used many times, the step of forming additional sacrificial layer, additional transistor structure, and performing additional CMP characterization and stripping must be present in the recycle loop. The limitation of

Art Unit: 1765

claim 20 has been discussed. Respect to claim 23, both Lawrence and Li discloses the test structures are formed in a plurality of structure densities, structure complexities and structure geometries (Lawrence's Fig 1; Li's Fig 1-3).

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence and Li as applied to claim 10 above, and further in view of Yonehara et al. (US 6,613,676).

Lawrence discloses a sacrificial oxide layer (i.e., SiO_2) formed over the surface to protect the structure and integrity of the substrate (Fig 2). However, Lawrence fails to disclose the specific thickness value of the sacrificial oxide layer. In a reclaiming process, Yonehara discloses a sacrificial silicon oxide layer with the thickness of $0.2 \mu\text{m}$ ($0.2 \mu\text{m} = 2,000 \text{ Angstrom}$) is sufficient to protect the substrate (col. 11 lines. 15-62). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Lawrence and Li in view of Yonehara by using sacrificial oxide layer with the thickness of 2,000 angstrom because it is sufficient to protect the substrate. Further, thickness is a result effective variable. The result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art.

Allowable Subject Matter

6. Claims 2-4, 7-9, 12-14, 16-19, 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Art Unit: 1765

7. The following is a statement of reasons for the indication of allowable subject matter: The cited prior arts fail to disclose or suggest either one of the following step in conjunction with other limitation in the claim: selecting from a plurality of test pattern geometries, densities and complexities of features, and using an appropriate test pattern mask to arrange the selected features in the test pattern die; or making simulated transistor features in and over the layer of oxide and depositing a layer of high density plasma fill over the simulated transistor features; or the shallow trench isolation formed in the sacrificial oxide layer.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (703) 308-1867. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G Norton can be reached on (703) 305-2667. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Binh X. Tran

NADINE G. NORTON
PRIMARY EXAMINER

